LESSON MAKER PRO

Layers of Space

Find and explain the volume of rectangular prisms.

GRADE 8 · PA.GM.2.3

PA.GM.2.3 "Justify why base area (B) and height (h) in the formula V=Bh are multiplied to find the volume of a rectangular prism. Use appropriate units (e.g., cm^3)."

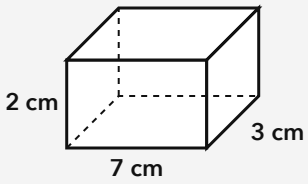
NAME _____ DATE _____

WHY MULTIPLY?

A rectangular prism can be filled with layers of unit cubes. The base area B tells how many unit squares are in one layer, and the height h tells how many layers are stacked. That is why V = Bh, and why the answer is in cubic units.

WORKED EXAMPLE

Find the volume of the rectangular prism shown.

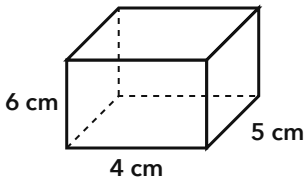


1. Find the base area: B = 7 cm × 3 cm = 21 cm^2.
2. Each 1-cm-high layer holds 21 unit cubes. The prism has 2 layers.
3. Multiply: V = Bh = 21 cm^2 × 2 cm = 42 cm^3.

Answer: 42 cm^3

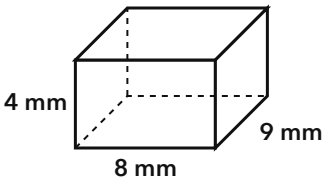
PRACTICE 6 problems

1 Find the volume of the prism shown.



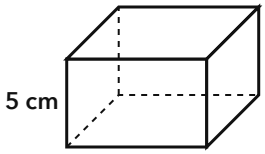
ANSWER _____

2 Find the volume of the prism shown.



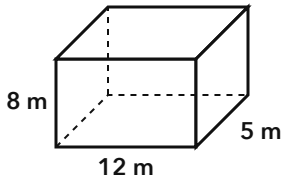
ANSWER _____

3 The base area and height are marked on the prism. Find its volume.



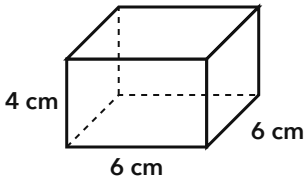
ANSWER _____

4 Find the volume of the prism shown.



ANSWER _____

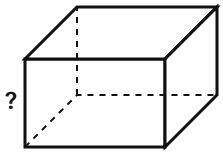
5 Find the volume of the prism shown. Then explain why multiplying its base area by its height gives the volume.



ANSWER _____

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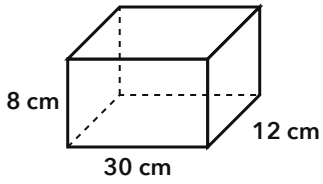
6 This prism has a volume of 384 cm^3. Find its missing height.



ANSWER _____

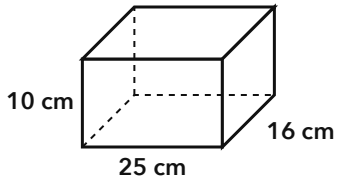
APPLY IT Show your work

1 A student designs a storage box for a game controller. Its inside dimensions are shown. How much space is inside the box?



ANSWER _____

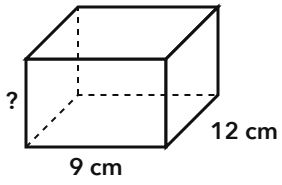
2 A sneaker shop builds a rectangular display case with the inside dimensions shown. What is its inside volume?



ANSWER _____

CHALLENGE One step up

The prism shown has a volume of 540 cm^3. Find its missing height. Explain why dividing the volume by the base area gives the height.



WORK SPACE AND ANSWER

Layers of Space

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the prism shown.	**120 cm^3**
2	Find the volume of the prism shown.	**288 mm^3**
3	The base area and height are marked on the prism. Find its volume.	**180 cm^3**
4	Find the volume of the prism shown.	**480 m^3**
5	Find the volume of the prism shown. Then explain why multiplying its base area by its height gives the volume.	**144 cm^3. Each 1-cm-high layer contains 36 unit cubes, and 4 layers contain 144 unit cubes.**
6	This prism has a volume of 384 cm^3. Find its missing height.	**8 cm**

PART 2 · APPLY IT

1. **2,880 cm^3** The base area is 30 × 12 = 360 cm^2. Multiply by the height: 360 × 8 = 2,880 cm^3.
2. **4,000 cm^3** The base area is 25 × 16 = 400 cm^2. Multiply by the height: 400 × 10 = 4,000 cm^3.

CHALLENGE

5 cm. The base area is 9 × 12 = 108 cm^2. Since V = Bh, dividing 540 cm^3 by 108 cm^2 gives h = 5 cm.

Accept equivalent explanations that describe the height as the number of 1-unit-high layers. Require cubic units for every volume and length units for a height.